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Cover Page Footnote
This paper is a report on a portion of the remains from a larger study which was completed with the assistance of many people. First I wish to thank Robert Ferguson for making the initial research and the preparation of this paper enjoyable and productive. He not only entrusted the faunal remains to me for study but also supplied excellent background information both through references and unpublished data. Dr. Howard Savage of the University of Toronto welcomed me to his laboratory and assisted me with many of the identifications, as is his custom. Without his support, many of the domestic mammal elements would not have been identified to their species. Similarly, many of the avian remains were positively identified by comparing them to the impressive reference collection of the Ornithology Department of the Royal Ontario Museum, and I thank Dr. James Dick for allowing me access to the collection on short notice when a winter storm kept me in Toronto. I thank those who expressed interest in this material at the CNEHA meetings in Ottawa in October 1985 and since. Finally, I express my appreciation to the reviewers of this paper and to Gail Pool for his overtime with our children while I did the analysis and report writing of the Signal Hill faunal material.

MESS CALLS FROM SIGNAL HILL, NEWFOUNDLAND

Frances L. Stewart

Test excavations in the summer of 1984 for a resource inventory of Signal Hill National Historic Park, St. John's, Newfoundland, unearthed 1,954 faunal elements from structures built between 1790 and 1945. These were predominantly military buildings, although some were converted to civilian hospitals. Signalmen and their families have lived on the site also. The site, however, was mainly occupied by a British garrison from 1790 to 1870. The faunal remains from the various structures were analyzed as distinct units, and in this article, those from the buildings constructed and used by the British garrison are emphasized. The majority of the bones and teeth were from domesticated mammals with a few avian remains and a surprising 20% local fish. In addition to deducing the soldiers' diets from these faunal remains, those specimens of particular interest to broader issues are discussed.

Introduction

Signal Hill is located above the capital city of St. John's in the southeastern corner of Newfoundland on "folded and eroded beds of sedimentary rock [which] form three ridges with intervening valleys running north/south through the park" (Ferguson 1986a: 344). The inhabitants of this elevated, wind-swept locale might have availed themselves of the 14 species of mammals native to the island and of three of the five introduced wild animals (Cameron 1958). For the most part, they did not. Greater use was made of the local fish, but very few wild fowl were represented in the skeletal elements presented to this author for study by Robert Ferguson of Parks Canada, Archaeology Division, Atlantic Region.

The history of the Signal Hill fortifications, hospitals, and signalling facilities has been researched by Candow (1979, 1980a, 1980b) and others (Ingram 1964; Proulx 1978). Their work provided valuable documentation for the archaeological testing of the site by Ferguson (1986a, 1986b). From these two sources of information, a brief summary of the activities on the hill can be reconstructed.

Like many historical sites in the Maritimes, Signal Hill was initially occupied by the French and later by the English as both powers tried to protect their fisheries' interests and their training grounds for sailors for their warships. The conflicts between the French and the English throughout the 17th and 18th centuries affected Signal Hill and the nearby settlement at Placentia, called Castle Hill. (See Grange 1971 for a report on the excavations of the Castle Hill site.) This latter was a fortified French stronghold from its inception in 1662, whereas St. John's lacked defenses until 1697. The early St. John's fortifications were built down along the Narrows by the English, and the first constructions on the hill itself were two breastworks built by the French on a ridge overlooking Cuckold's Cove in 1762 (FIG. 1). In the same year, in what is known as the Battle of Signal Hill, the French were defeated, and from then on the hill remained in English hands. The archaeological work did not uncover evidence of this early period; rather, it focused on the period after 1790. "Military construction on the actual summit of Signal Hill dates to 1791 when a guard house was begun [but] concentrated work did not get underway until 1795 [when] a block-house was erected near Ladies Lookout" (Candow 1979: 33). In the same year, the first barracks was built and "by October 1798 a soldiers' barracks for 72 men was under construction on the summit of Signal Hill" (Candow 1979: 37). In 1799, another barracks was needed, but construction was delayed by a lack of skilled builders until 1807, when a detachment of the Royal Military Artificers came out from England. By 1805, however, according to Candow (1979: 39), there were 10 buildings on the summit of Signal Hill, and these were protected by batteries and armaments. The arrival of more artificers in 1808 "brought to 70 the number of labourers

permanently employed at the works [and] many of the married artificers, acting on the advice of Commanding Engineer Ross, erected as living quarters small huts in the valley between Signal Hill and the sea—hence the name Ross's Valley" (Candow 1979: 44). At this time, the garrison numbered about 500 men (Candow 1979: 44), so it can be concluded that at least 600 people, including a few wives and children at Ross's Valley, were housed and fed on Signal Hill in the early 1800s. In 1810, "32 masons and stonecutters arrived from Ireland bringing the permanent work force up to the desired level of 100 men" (Candow 1979: 45-46) and it can be surmised, to a total population of over 600. From the records, it appears that these 600 to 700 people were the most that were ever housed on the hill.

Because some of the early buildings were collapsing, by 1811 there were only "three barracks, one for soldiers, one the 1806 officers' barracks, and finally, the artificers' barracks, which was in fact a converted carpenters' shed" (Candow 1979: 4). In Ross's Valley, there were 12 temporary (temporary since 1806) huts for the married artificers and their families. However,

> The workshop yard on Signal Hill located on a flat between the summit and Queen's Battery, was fairly extensive. It consisted of: mason's shed, master mason's store and office; quarters for a non-commissioned officer . . . , a store for small articles; a store for prepared doors, sashes, boards and the like, with a cellar; a master smith's office and store, with a guard room; a smith's shop and four double hearths; a carpenter's store and office; a store for brick scaffolding and saw pit (Candow 1979: 48-49).

Little construction was undertaken on Signal Hill from 1812 to 1831. Despite interest in defense increasing in response to the War of 1812, so little building was done that the Irish workmen were dismissed and the number of Royal Artificers reduced. Plans for a tower were not realized and from "1825-70, the garrison strength never exceeded 400 men" (Candow 1979: 58). By 1827, "the barracks in town had . . . replaced those of "Signal Hill" which were "no longer being

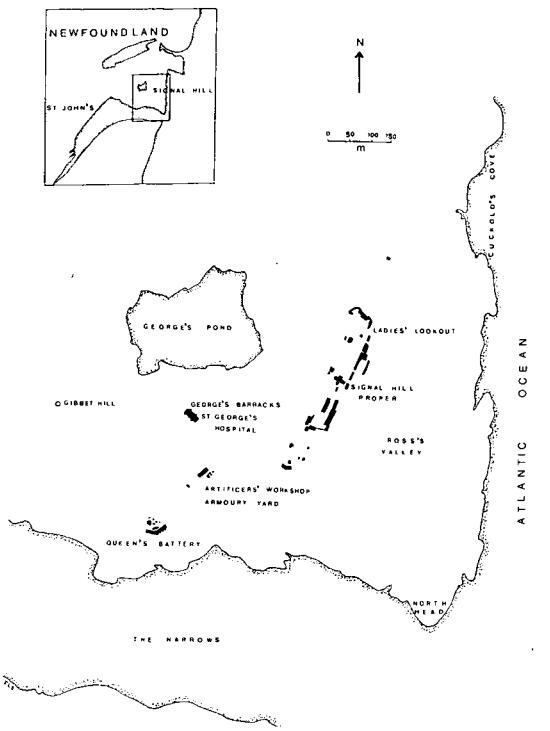

Figure 1. Signal Hill National Historic Park, St. John's, Newfoundland. The inset map shows the position of Signal Hill in relation to the city of St. John's. The archaeological areas referred to in the text are shown on the larger sketch map. The buildings are historic, mainly military structures, which are no longer standing.

used as barracks. Instead, convalescent veterans were sent there to recover. This is the first recorded use of Signal Hill as a hospital site" (Candow 1979: 61).

Renewed interest in Signal Hill began in 1831. Renovations were made to existing buildings, and a new barracks for one non-commissioned officer and 13 men was built. Gun platforms were relaid and sheds were built for artillery while some older structures were torn down. The garrison at this time was only 337 men strong, but 91 wives and 220 children also had to be accommodated. Unfortunately, the Officers' Barracks were very uncomfortable, being exposed to the winds on the summit; recommendations for a new barracks in another spot were made (see Candow 1979:

66-71). This was begun in 1836 after completion of a new canteen and a masonry commissariat store on the summit in the previous year. "Other buildings constructed in 1836 were a carriage shed, engine house, where fire-fighting equipment was kept, and a stable. . . " (Candow 1979: 72). A new soldier's barracks was completed on the summit in 1840, but like the Officers' Barracks, dampness and poor ventilation created smokey conditions that made both buildings uncomfortable. By 1842, the people were moved out of these summit barracks, and the stone barracks was converted into stores. As previously recommended, a new barracks was planned for a more sheltered location near George's Pond (Candow 1979: 75-77). A hospital constructed near George's Pond at this time, however, also had smoke problems. When it was finished in 1843, it was deemed unfit for patients although suitable for soldiers. Except for this hospital/barracks and a new stone guard house, there was little construction on Signal Hill in the 1840s.

As Britain moved towards leaving the responsibility for defense to her colonies, less money was spent on military installations and men. From 1852-54, the Royal Artillery was withdrawn while the Royal Newfoundland Companies declined from 320 men in 1854 to 220 in 1861. To fill this gap, a local militia named the St. John's Volunteer Rifle Battalion was organized in 1860, but its members continued to live in their own homes.

The American Civil War, 1861-65, caused reinforcement of the depleted garrisons and an upgrading of St. John's defenses. "During 1862, the old powder magazine on the summit of Signal Hill was enlarged" (Candow 1979: 85) and batteries were approved. The regiment stationed at St. John's

> continued to use the 1842-43 barrack at George's Pond, except for the married men, who in 1864 moved to the 1837-40 masonry soldiers' barracks . . . on the summit. The smoking chimnies there had not been corrected, and in the winter of 1865-66, the men and women were forced to live for awhile in the old wooden barracks on the summit. This was only . . . temporary . . . (Candow 1979: 85-86).

After, this wooden barracks served as a regimental school until 1866-67 when it was converted into a temporary hospital. By 1870, all the garrison had been removed ending "the imperial era in the military history of Newfoundland" (Candow 1979: 87) and bringing the history of this site up to the end of the period considered in this article. (See Candow 1979 for details on the activities at Signal Hill after 1870.)

Excavations on Signal Hill in the summer of 1984 unearthed 1,954 faunal elements from structures built between 1790 and 1945 for a variety of functions. The use of the site as a military installation predominated, but military buildings were converted to hospitals and a jail, a hospital was used as a barracks, and later signalmen lived on the hill. It was from here, the most easterly point of land in North America, that Marconi sent the first trans-Atlantic wireless message. During the Second World War, the United States army installed guns here and even more recently, some of the earlier foundations have been disturbed by a parking lot. In the summer of 1984, Ferguson excavated test pits in various features across the site.

The 1984 survey tested the following structures and/or areas:

LADIES LOOKOUT
North Range Soldiers' Barracks
lower terrace
SIGNAL HILL PROPER
1837 soldiers' barracks
1836 officers' barracks
wash house
1806 officers' barracks (parking lot)
ARTIFICERS' WORKSHOP/ARMOURY YARD
armoury
subaltern's residence
yard & palisade
field
unidentified feature
ARTIFICERS RESIDENCE, ROSS'S VALLEY
GEORGE'S BARRACKS/ST. GEORGE'S HOSPITAL
GIBBET HILL
guardhouse/barracks
World War II gun position

CARRONADE HILL
carronade battery
World War II gun position

"Surface reconnaissance alone was used to investigate gun battery sites in Cuckold's Cove and a cholera hospital in Ross's Valley" (Ferguson 1986a: 345). Mixed in with the artifacts in these test units were the well-preserved faunal remains.

In this article, those remains from features dating to the British occupation period, or from ca. 1790 to 1870, will be emphasized. Details on the complete faunal sample from this site have been reported elsewhere (Stewart 1986). In addition to presenting the basic information on what was found, comments are offered on the remains that are of particular interest to faunal analyses in general. In fact, this study is a good example of why the faunal remains from a site should not be studied as a single entity; rather, the proveniences of the remains must be given foremost consideration. In this case, time depth is relatively short compared to many prehistoric sites, but the diverse uses of this site make it imperative that the remains be considered as distinct units.

The Faunal Remains from Signal Hill

The faunal remains included skeletal parts of mammals, fish, and birds in that order of decreasing frequency. Within the mammalian class, the elements from the domestic species, the cow (*Bos taurus*), pig (*Sus scrofa*), and sheep (*Ovis aries*), were more common than those from wild mammals.* The Norway rat (*Rattus norvegicus*) was found in a number of localities; there were a few remains of seal (*Phoca sp.*) and muskrat (*Ondatra zibethicus*); single elements of the vole (*Microtus pennsylvanicus*) and the red fox (*Vulpes vulpes*) were identified. The fish remains came from at least five species, but cod (*Gadus morhua*) occurred much more often than any of the others, followed by the Atlantic herring (*Clupea harengus*), flatfish (families Bothidae and Pleuronectidae) and rockfish (family Scorpaenidae). Only a single bone from a trout or salmon (family Salmonidae) was identified. Much less frequent were the bones of birds. The domestic chicken (*Gallus gallus*) was most frequently followed by the shearwater (*Puffinus gravis*). Black duck (*Anas rubripes*) and willow ptarmigan (*Lagopus lagopus*) were each represented by a single bone.

A review of the life histories of the represented species showed that all of them live in the vicinity of Newfoundland, although the shearwater is usually found far offshore. The seal and some of the fish have a seasonal availability only. Seasonality is not discussed in detail because it is known that the site was used throughout the year and because the diet was based mainly on domestic species that were available year round. The best seasons for specific activities such as cod fishing, however, are noted. Before discussing the particular remains deposited by specific groups of people who lived on this site, information will be given on the species represented in the phylogenetical order.

Represented Fish Species

At least five species of fish were represented in the Signal Hill sample. All were locally available, but only the cod and perhaps the herring were fished regularly. The particular bones identified as Atlantic herring were skull elements of large, adult herring rather than the small "sardines" which are immature individuals. Thus these fish were likely caught when they spawned, a time that varies from year to year but falls between April and November, with most occurring in May and August (Leim and Scott 1966: 96). All but one of the eight herring specimens were from the midden of the Soldiers' Barracks located on the Ladies'

*Scientific names are given when the animal is first cited only. Scientific names for fish, birds, and mammals are from Leim and Scott 1966, Godfrey 1966, and Peterson 1966, respectively.

Lookout and dated to the first half of the 19th century (TABS. 1, 2).

The Atlantic cod was the most frequently identified fish species in the total site sample. Cod bones occurred throughout the site in deposits that spanned all the occupation periods. Most of these bones were comparable in size to the author's 5 lb reference specimen, although a few were from heavier fish; some matched a 4 lb reference specimen. This species has been important economically ever since the settlement of Canada by Europeans. In fact one of the reasons for establishing the Signal Hill defenses was to protect the fishing fleets and the fishing grounds. Newfoundland has been particularly involved in the cod fishery because the cod migrate by western Newfoundland out of the Gulf of St. Lawrence in the late fall and winter and back into the Gulf in the spring (Leim and Scott 1966: 96).

While cod could be fished most successfully in the late fall and spring, they may have been consumed in other seasons as dried and/or salted fish. Ferguson noted that "eighteenth century military maps indicate fish flakes in the shelter of the south bank" of Cuckold's Cove (1986a: 357). The particular cod elements found on the site, however, do not indicate any special processing of this species. Both skull and infra-cranial elements were recovered, and the vertebral centra were from all sections of the column. None of these fish vertebral centra were identified beyond the family level, but if it is assumed that those labeled as cod family were from the Atlantic cod on the basis that all of the skull bones identified in this family were from that species, then the parts of the cod skeleton were proportionately represented. Of the 162 cod and cod family bones, 57 were skull elements, and 105 were from the vertebral column. Of the latter, using Casteel's (1976) nomenclature, two were atlas vertebrae, one was a second vertebra, four were thoracic, 25 were precaudal, and 57 were caudal, with 16 not assigned to their positions in the column. From these figures, it is reasonable to conclude that whole fish were being carried up the hill to the site for preparation and consumption rather than merely the fillets, whether fresh or dried.

Other fish species were used sparingly. Two rockfish, two flatfish, and a single salmon family bone were the only other fish remains found on the site. The fact that the 405 fish bones constituted 21% of all the skeletal remains from the site, however, is significant. Here cod was an important addition to the army rations, perhaps because the local men were recruited and many of them were fishermen, as Nicholson has shown in his history of the Royal Newfoundland Regiment (1964). Further, some sources state that the militiamen were encouraged to fish both for the recreation it provided and also to supplement the diet, which was often of limited quality and quantity for army personnel (Connolly 1855, Vol. 1: 158).

Represented Avian Species

Bird bones were very infrequent in the faunal sample from Signal Hill, but three wild species and two domestic ones were identified. In total, there were only 28 bird bones on the site; this was just under 1.5% of all the faunal remains. Most interesting of the wild species was the Greater Shearwater (TABS. 2, 3). Shearwaters are seldom found in faunal assemblages because they spend most of their lives at sea, ordinarily coming ashore to nest only (Godfrey 1966: 20). The Greater Shearwater does not breed in the north Atlantic region and is only seen in Newfoundland when easterly storms blow it there. Bent noted, however, that these birds often stay close to fishing vessels and that "prior to 1875 sea birds notably the greater and sooty shearwaters, were extensively used for bait on the Grand Banks" (Bent 1964: 69). The birds were caught by two men in a dory who had mackerel hooks baited with cod livers, which the shearwaters were eager to take. Bent (1964: 69) also quoted a Captain Collins who said, "shearwaters were formerly important items in the bill of fare of a Grand Banks

TABLE 1
FAUNAL REMAINS FROM THE SOLDIERS' BARRACKS MIDDEN ON LADIES' LOOKOUT, SIGNAL HILL (1A51A)
(1800 TO 1842 AND IN THE WINTER OF 1865–66)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	165		0	0/0	0
Large Fish	17		0	0/0	0
Salmon Family	1	1	0	0/0	0
Atlantic Herring	7	2	0	0/0	0
Atlantic Cod	33	5	0	0/0	0
Cod Family	75		0	0/0	0
Rockfish Family	1	1	0	0/0	0
Flatfish Family	2	1	0	0/0	0
SUBTOTALS	301	10	0	0/0	0
Medium-sized Bird	1		0	0/0	0
Black Duck	1	1	0	1/0	0
Greater Shearwater	1	1	0	0/0	0
Domestic Chicken	1	1	0	0/0	0
Willow Ptarmigan	1	1	0	0/0	0
SUBTOTALS	5	4	0	1/0	0
Mammal	456		11	18/2	8R
Large Mammal	55		13	0/0	3R
Medium-sized Mammal	34		1	0/0	2R/1C
Norway Rat	6	1I	0	0/0	0
Pig	24	1I/1A	8	0/0	5R/1C
Pig, likely	2		0	0/0	0
Sheep	5	1	2	0/0	0
Sheep, likely	3		0	0/0	1R
Cow	13	1I/1A	7	0/0	0
Cow, likely	2		0	0/0	0
Cow, or Horse	1		0	0/0	0
Ringed Seal	1	1A	0	0/0	0
SUBTOTALS	602	7	42	18/2	19R/2C
Class unknown	3		0	3/0	0
GRAND TOTALS FOR 1A51A	911		442	22/2	19R/2C

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

fisherman, and that the men were sometimes very fond of this food." Bent (1964: 69) added: "I have eaten both the greater and sooty shearwater and have found them not unpalatable, in fact rather good." It can be concluded that the shearwater elements from Signal Hill were food refuse, as it seems less likely that they would have been carried up the hill if they were bait.

Shearwater bones were also recovered at the Castle Hill site near Placentia, Newfoundland, built by the French in the late 17th century and rebuilt by the British in 1762. This fort was used during the late 18th century but abandoned in 1811 (Grange 1971, Vol. 1). Thus much of its construction and occupation predates the Signal Hill installations, but there was some contemporaneity and even interaction between the two (Candow 1979: 3-19). About the shear-

TABLE 2
FAUNAL REMAINS FROM OFFICERS'/SOLDIERS' BARRACKS, SIGNAL HILL PROPER, SIGNAL HILL (1A46A)
(HOSPITAL USE 1870 TO 1920)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	17		0	0/0	0
Atlantic Herring	1	1A	0	0/0	0
Atlantic Cod	2	1	0	0/0	0
Cod Family	4		0	0/0	0
SUBTOTALS	24		0	0/0	0
Bird	1		0	0/0	0
Large bird, likely Domestic Chicken	1	1I	0	0/0	0
Domestic Chicken	5	1A	0	0/0	0
SUBTOTALS	7		0	0/0	0
Mammal	12		1	0/0	1C
Large Mammal	9		1	0/0	0
Pig	4	1I/1A	1	0/0	1R
Cow	7	1	5	0/0	1R
Sheep	2	1I	1	0/0	1C
SUBTOTALS	34		9	0/0	2R/2C
GRAND TOTALS FOR 1A46A	65		9	0/0	2R/2

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

water remains, Grange reported (1971, Vol. 3: 956)

> Elements of these birds were found in both French and English contexts in the site. They prefer to stay at sea when in the Newfoundland area which suggests that their presence in the site is not accidental. The Sooty Shearwater was often used for bait and is preferred above the Greater Shearwater as food; the latter is "common fare" among Newfoundland fishermen.

At Castle Hill, shearwaters were relatively insignificant (Grange 1971, Vol. 1: 979) whereas they were common in the admittedly few wild bird specimens from Signal Hill.

Much more frequently identified in the very few bird bones were those of the domestic chicken with a single additional bone being domestic goose (subfamily Anserinae). This latter specimen came from the Artificer's Workshop and dated to between 1807 and 1814 (see TAB. 3). Chicken bones occurred across the site and throughout all the time periods. All parts of the skeleton were recognized, suggesting that whole chickens were processed up on the hill rather than decapitated cleaned fowl being bought in the town below. It is possible, however, that chickens with their feet and heads still attached were purchased in St. John's. Surprisingly, there are few references to chicken in the historical sources. In sum, birds were not very significant to the diet of any of the occupants of Signal Hill, but chickens were consumed from at least 1795.

Represented Mammalian Species

As is true of most archaeological faunal collections, mammalian remains dominated this assemblage. Like the birds, there were few *wild* mammal elements, but some of these were very interesting. Muskrat re-

TABLE 3
FAUNAL REMAINS FROM THE ARTIFICERS'/ARMOURY COMPLEX, SIGNAL HILL.
THE ARMOURY (1A30A)
(CA. 1814)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	1	1	0	1/0	0
Domestic Goose	1	1A	0	0/0	0
Shearwater sp.	5	1	0	0/0	0
SUBTOTALS	6	2	0	0/0	0
Mammal	50		4	16/2	1
Large Mammal	4		4	0/0	0
Medium-sized Mammal	8		0	0/0	0
Small Mammal	1		0	0/0	0
Pig	3	1A	0	0/0	0
Cow	10	1I	7	0/0	0
Sheep	3	1I	1	0/0	0
SUBTOTALS	79	3	16	16/2	1
Class unknown	2		0	0/0	0
GRAND TOTALS FOR 1A30A	88		16	17/2	2

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

mains were found in two buildings, one of which was constructed during the British occupation period (see TABS. 4, 5). This animal may have been eaten or trapped for its fur, or both. It is of interest because it suggests that the source of fresh water up on the hill, George's Pond, had in the past cattails or other vegetation suitable for muskrats. In the 1840s, there was a marsh near the hospital site, which in turn was located near the pond. This marsh may have been filled in as early as 1843 (Candow 1979: 77). A second interesting wild species was the seal, represented by only two bones from different features of the British occupation period (see TABS. 1, 6). These attest to at least minimal use of local mammals and invite the speculation that some of the soldiers may have enjoyed flipper pie. Both specimens were forelimb elements.

Of interest to faunal analysts are the nine rat bones that were all identified as Norway rat. There has been some discussion about the introduction of Black (*Rattus rattus*) and Norway (*Rattus norvegicus*) rats, and it appears that while the Black rat came first, the Norway rat was the species that dominated in Newfoundland after its arrival in 1775 (see Cameron 1958; Hall and Kelson 1959; Peterson 1966). The earliest rat remains in this sample came from the guard house on Gibbet Hill in deposits dating from 1811 to 1870 (see TAB. 7). In 1840, this building was so infested with "vermin" that the guards were forced to stay in tents outside the house (Candow 1979: 78). Rat bones were found in later deposits, too (see TABS. 1, 4, 8). Although Norway rats do not carry the diseases that are associated with Black rats, they were reportedly a nuisance to the soldiers and likely also to the hospital workers of Signal Hill.

More significant to the military men were the domesticated mammals as these were the main ingredients of their soups and stews which, along with bread, repeatedly formed the bulk of their meals. Cow, pig, and sheep were the domestic mammals rep-

TABLE 4
FAUNAL REMAINS FROM GIBBET HILL, SIGNAL HILL. GUARD HOUSE/BARRACKS: MID 19TH CENTURY (1A39B)
(CA. 1825 TO POST-1850)

Identifications	Numbers	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	8		0	0/0	0
Atlantic Cod	10	3	0	0/0	0
Cod Family	16		0	0/0	0
SUBTOTALS	34		0	0/0	0
Domestic Chicken	3	1	0	0/0	0
Mammal	94		2	19/5	0
Large Mammal	13		9	1/1	0
Medium-sized Mammal	6		1	0/0	0
Muskrat	1	1	0	0/0	0
Pig	6	1I/1A	0	1/0	0
Cow	5	1A	2	0/0	0
Sheep	4	1I/1A	0	0/0	0
SUBTOTALS	129		14	21/6	0
GRAND TOTALS FOR 1A39B	166		14	21/6	0

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

TABLE 5
FAUNAL REMAINS FROM BARRACKS/ST. GEORGE'S HOSPITAL, SIGNAL HILL (1A31A)
(AS A BARRACKS FROM CA. 1843 TO 1870)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	3		0	1/1	0
Flatfish	1	1	0	0/0	0
Atlantic Cod	1	1	0	0/0	0
Cod Family	7		0	0/2	0
SUBTOTALS	12		0	1/3	0
Mammal	26		0	1/8	0
Large Mammal	13		3	1/4	0
Medium-sized Mammal	3		1	0/0	0
Muskrat	3	1I	0	0/0	0
Pig	1	1	0	0/0	0
Cow	7	1I	4	0/3	0
Cow or Horse	2		1	0/1	0
Sheep	1	1I	0	0/0	0
SUBTOTALS	56		9	2/16	0
Invertebrate	1		0	0/0	0
GRAND TOTALS FOR 1A31A	69		9	3/19	0

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

TABLE 6
FAUNAL REMAINS FROM THE ARTIFICERS'/ARMOURY COMPLEX, SIGNAL HILL.
SUBALTERN'S DWELLING (1A26A)
(CA. 1843)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Mammal	90		3	51/0	0
Large Mammal	2		0	0/0	0
Medium-sized Mammal	1		0	0/0	0
Pig	2	1	0	0/0	0
Cow	2	1	0	0/0	0
Sheep	9	1I/2A	0	0/0	0
Seal	1	1I	0	0/0	0
SUBTOTALS	107		0	51/0	0
Class unknown	1		0	1/0	0
GRAND TOTALS FOR 1A26A	108		3	52/0	0

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

TABLE 7
FAUNAL REMAINS FROM GIBBET HILL, SIGNAL HILL. GUARD HOUSE/BARRACKS:
EARLY 19TH CENTURY (1A39A)
(1791 TO CA. 1825)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	5		0	0/0	0
Atlantic Cod	3	1	0	0/0	0
Cod Family	6		0	0/0	0
SUBTOTALS	14	1	0	0/0	0
Mammal	46		1	3/1	0
Large Mammal	12	1I	0	0/1	0
Medium-sized Mammal	17		1	0/1	0
Snowshoe Hare*	1	1A	0	0/0	0
Norway Rat	1	1A	0	0/0	0
Meadow Vole*	1	1A	0	0/0	0
Pig	10	1I/1A	4	0/0	1R
Cow	6	1A	4	0/0	1R
Sheep	3	1I	0	0/0	0
SUBTOTALS	97		10	3/3	2R
GRAND TOTALS FOR 1A39A	111		10	3/3	2R

*Snowshoe hare bone was from a recent stratum and the vole may have been an intrusive burrower.

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

TABLE 8
FAUNAL REMAINS FROM A POSSIBLE WASH HOUSE, SIGNAL HILL (1A50A)
(CA. 1835)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	8		0	0/0	0
Atlantic Cod	3	1A	0	0/0	0
Cod Family	1		0	0/0	0
SUBTOTALS	12		0	0/0	0
Mammal	33		0	0/0	0
Large Mammal	7		1	0/0	0
Norway Rat	2	1A	0	0/0	0
Pig	2	1I/1A	1	0/0	1C
Cow	4	1	0	0/0	0
Sheep	1	1	0	0/0	0
SUBTOTALS	49		2	0/0	1C
GRAND TOTALS FOR 1A50A	61		2	0/0	1C

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

resented in order of decreasing frequency with totals of 69, 59, and 37 elements respectively. There were no remains of horses, dogs, or cats. Are some still buried in the unexcavated parts of the site? This seems highly probable for the horse, since stables were drawn on some plans of the fort (R. Ferguson, personal communication 1985) and Candow noted that a stable was constructed in 1836. If he is correct in his assumption that this building was for "the horses which pulled the fire wagon" (1979: 72), then it may be that only a very few horses were ever on the site. At present, there is no archaeological evidence that dogs or cats were kept by the people living on Signal Hill prior to 1945, and Candow does not mention them. Cat bones were recovered from both French and English refuse at Castle Hill (Grange 1971, Vol. 3: 954). The low incidence of bones bearing canine punctures or chewing marks in the Signal Hill sample is supportive evidence for the lack of cats and dogs. Usually dog remains and ostephagia are associated in faunal samples.

The proveniences of the domestic mammal remains were examined to see if it could be established when each was first used on the site. All three were recovered from the lowest levels of excavation of all the structures investigated, and these included those first constructed by the British. Thus, it is apparent that cattle, sheep, and pigs were all used from the onset of the British occupation, and it is possible that they were used even earlier by the French. Secondly, the specific elements present were examined to see whether parts of these large mammals were bought from butchers in St. John's.

For example, sides of beef or pork could have been bought from local butchers. Wilson (1974: 103) documented the use of salt pork at Fort George, Niagara on the Lake, but if it was consumed at Signal Hill, there is no trace of it in the archaeological record. Since most parts of many of the animals' skeletons were represented, it appears that some whole carcasses were processed up on the hill. Skull and foot elements of cows were not found, however, indicating that these animals may have been slaughtered elsewhere. Such elements were rare for pigs as well, but skull elements were common for sheep, especially in the

TABLE 9
FAUNAL REMAINS FROM THE TERRACE MIDDEN BELOW THE LADIES' LOOKOUT, SIGNAL HILL (1A53A)
(1800 TO 1842)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Fish	2		0	0/0	0
Atlantic Cod	2	2	0	1/0	0
Cod Family	2		0	0/0	0
SUBTOTALS	6	2	0	1/0	0
Domestic Chicken	1	1	0	0/0	0
Mammal	73		2	32/0	0
Large-sized Mammal	8		2	0/0	0
Medium-sized Mammal	2		1	1/0	0
Pig	1	1	0	0/0	0
Cow	1	1	0	0/0	1C
Sheep	2	1I	1	0/0	0
SUBTOTALS	87	3	6	33/0	1C
Class Unknown	1		0	1/0	0
GRAND TOTALS FOR 1A53A	95	6	6	35/0	1C

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

Subaltern's Dwelling, which was occupied around 1843 to 1851 (see TAB. 6). As could have been expected, these elements were frequently from immature animals, and they often bore cut marks on the ribs and vertebrae.

Significantly for faunal studies, only one long bone bore traces of spiral fracturing. This indicates that the marrow was not extracted from the bones, which is not unexpected in European refuse. Neither Grange (1971) nor Wilson (1974) mentioned it in their discussions of the faunal remains from Castle Hill and Fort George, respectively, but perhaps the bones were not examined for this evidence. This absence of spiral fracture features is significant for faunal analysts and archaeologists because it supports Bonnichsen's argument that these features, which he identified as indicative of human butchering practices, do not occur *naturally* to buried bone (Bonnichsen 1979).

In sum, the faunal evidence confirms the historical documentation that some livestock was kept on the hill, at least by the families living in Ross's Valley (Ferguson, personal communication 1985). Considering their numbers and their distributions across the site and through time, it is apparent that cows, pigs, and sheep provided most of the meat consumed by the inhabitants of Signal Hill.

Comparison of Faunal Remains Across the Site

Since the Signal Hill site includes structures built for different functions over more than 100 years, it would seem to offer great potential for comparison of the diets over time and for different classes of people in the army. There were also three hospital components, the signalmen's residence, and the domestic refuse of families of army personnel living in Ross's Valley. There are limitations to such comparisons, however. First, it must be emphasized that only a very small proportion of each structure was

excavated, and in some instances the findings did not allow precise identifications of the buildings' functions. Secondly, many of the structures investigated had been used for more than one purpose, and thus the faunal material might be from only one or from a combination of these uses. Except for the Soldiers' Barracks on Ladies' Lookout, with 911 specimens, the faunal samples were small. Further, the dating of the faunal samples was problematical in some cases. Thus the following comments on the diets of the various inhabitants must be accepted with caution.

It was the excavations in the Soldiers' Barracks on Ladies' Lookout that yielded enough faunal specimens to allow reliable reconstructions. Furthermore, the sample collected from the barracks can be augmented with the bones from the midden excavated part way down the slope, as it is felt that these two features are both related to the soldiers housed here. Since this is the largest faunal sample, the soldiers' diet will be emphasized.

As Ferguson (1986a: 346) has described it, the Soldiers' Barracks on Ladies' Lookout, a

> wood frame structure on masonry foundation, 45.7 × 7.3 m., was one of the earliest built on the hill, yet managed to survive in its uncompromising environment beyond the end of the military occupation. Completed in 1800, it served as a barracks at least until 1842 . . . . It was home to as many as 144 men, some with their wives and children. An illustration of the hill in 1884 shows the barracks still standing.
>
> Testing revealed a well-preserved masonry foundation of roughly cut stone facing and rubble fill at the southeast corner of the building. A deep midden from the military occupation covers the ground beside it, held from slumping onto the terrace below by a later retaining wall.
>
> The midden deposit reflects the domestic function of the building, particularly during the first half of the 19th century. All ceramic ware types found, with creamwares and pearlwares predominant, were in use prior to 1850 . . . .

Using the data from this barracks (TAB. 1) and the associated midden on the lower terrace of the Ladies' Lookout (TAB. 9), it can be concluded that the soldiers stationed here enjoyed meals with considerable diversity in their meat component. Grange (1971, Vol. 1: 962-966) has discussed in some detail the problems in estimating the importance of the various species to the total diet of a population based on the faunal remains recovered from an historical site. Since methods for estimating the amount of meat represented by the bones recovered have not been perfected, only general estimates can be suggested. Based on the number of fish remains compared to those of the other classes and allowing that fish are almost always smaller than domestic mammals, even though more of the former's bodies are edible, it can be assumed that at the Soldiers' Barracks about a quarter of the diet was fish with a great emphasis on cod. The soldiers were also served a little poultry and a variety of mammals including seal. The relative numbers of specimens identified to the different mammal species and the minimum numbers of individuals represented indicate that the men were fed pork most often, but beef and occasionally lamb were offered. Of all the groups living on Signal Hill, the soldier's diet appears to have been the most varied. This can be seen by comparing Table 1 and Table 9 with the remaining tables. The variety can be considered in two opposing ways. It may have been desired or it may have been imposed because the choice items were not always available to the soldiers. Whether they preferred it or not, this diet was more nutritious than the standard army rations which were mainly bread, soup, and stews prior to 1870. Whitfield (1978: 38-39) gives details of the soldiers' rations:

> On December 24, 1850 new regulations were issued to try and bring some consistency to the provision of food to British soldiers. The daily ration as of March 31, 1851 was one pound of bread or three quarters of a pound of biscuit and one pound of fresh meat or of salted beef or pork. The soldier's pay was deducted . . . for

TABLE 10
FAUNAL REMAINS FROM THE ARTIFICERS'/ARMOURY COMPLEX, SIGNAL HILL.
UNIDENTIFIED FEATURE (1A27A)
(1807/1811 TO 1851+)

Identifications	Number	MNI	Cut	Burnt Cal./Char.	Chewed Specimens
Domestic Chicken	1	1	0	0/0	0
Mammal	26		1	17/0	0
Medium-sized Mammal	1		0	0/0	0
SUBTOTALS	27		1	17/0	0
Class unknown	4		0	4/0	0
GRAND TOTALS FOR 1A27A	32		1	21/0	0
Ross's Valley (1A54A) (1801–1819)	1 Large mammal unmodified bone and 1 adult Cow bone, unmodified				
Open Field (1A29A)	4 unmodified Mammal bones				

Key: A = Adult; I = Immature; MNI = Minimum number of individuals represented; C = Evidence of carnivore chewing; R = Evidence of rodent gnawing; Cal. = Calcined; Char. = Charred

> extras such as tea, coffee, vegetables, oatmeal, barley, spices and other extras .... There were three meals a day. Breakfast—Bread and tea or coffee (+ oatmeal [if] the men purchased it). Main Meal—A soup broth (meat usually cooked in broth but eaten separately) or stew and bread, tea or coffee. Dinner—Bread and tea or coffee.

Faunal samples attributable to the other user groups are not plentiful. The officers' menus cannot be reconstructed, but something of the subaltern's meals can be supposed from the faunal remains from his residence in the Artificer's Workshop complex, although general scatter from the garrison and later occupants may be included here (see TAB. 6).

> Six excavation units were placed in the complex, testing the armoury, the subaltern's residence, yard, open field beyond the palisade and an unidentified depression (Ferguson 1986a: 350).

No fish or avian bones were found in the trench dug into the subaltern's dwelling. There was a seal bone here, however, as well as domestic mammal remains with sheep predominating, followed by equal numbers of pig and cow bones. Many of the sheep* elements were teeth, and so it can be suggested that these animals were kept on the hill. Perhaps the subaltern was particularly fond of mutton? The persons living in the armoury in the Artificers' Workshop area were eating very little fish, some bird, both domestic and wild, but mainly beef with some pork and lamb or mutton (see TAB. 10).

In addition to these sources of protein, the people living on Signal Hill likely consumed some vegetables and fruits as well as beverages, particularly tea, the traces of which have not been preserved in the ground. In addition, it can be assumed that the chicken bones were likely remains of layers as well as boilers and that the cows would have supplied milk as well as meat.

*Both cranial and infra-cranial sheep elements were identified on the basis of their morphological features (cf. Boessneck 1969), and although it is possible that some goat remains also occurred in the sample, none were positively identified. Furthermore, Candow does not cite any reports of goat, and he has for sheep. (See, e.g., Candow 1979: 70.) Further excavations may prove that there were goats at Signal Hill, but at present there is no evidence for them.

Changes through time in the meat diets were not reflected in the faunal sample. In fact, it is evident that all of the domestic species represented were used from the earliest occupation of the site through to the most recent times. Whitfield noted that the army food was not always of a reasonable quality but that by the mid- to late 19th century, more attention was paid to the inspection of meat and bread before it was issued to the troops. There was no training for cooks, however, until the 1870s (Whitfield 1978). Thus for most of the time when Signal Hill was occupied, it can be assumed that poor quality meat and bread was being prepared by people who had no formal training in cooking.

In summary, this study has shown that the army personnel at Signal Hill relied on cows, pigs, and sheep for most of their meat sources, with some chicken, as did other military people in North America in the 1800s (see Cleland 1970, Grange 1971, and Wilson 1974 for examples). The analysis of the faunal remains from Signal Hill has revealed that in Newfoundland, the soldiers supplemented their diet with the abundant local cod, some herring, and a few other fishes. Minimal use was made of the local birds, and there was no evidence for the hunting of migratory geese or ducks. As well, only a few wild mammals were eaten. Of special interest to faunal analysts were the shearwater and rat bones, the lack of spiral fracturing features on the long bones, and the distinctive subsets of faunal assemblages within one site sample.

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